PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Phillip Kent Niccum		§	Examiner:	Boyer, Randy
Serial No.:	10/711,308	§	Group Art Unit:	1797
Filed:	September 9, 2004	§	Docket No:	04-10
For:	Self-Stripping FCC Riser Cyclone	§	Confirmation No.:	5307
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APPEAL BRIEF SUBMITTED UNDER 37 C.F.R. § 41.37

Applicant submits this Appeal Brief to the Board of Patent Appeals and Interferences on appeal from the decision of the Examiner of Group Art Unit 1797 dated July 24, 2008, finally rejecting claims 1, 4-6, 21-25 and 27-33.

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I. Real Party in Interest

The real party in interest is Kellogg Brown & Root, a limited liability company.

II. Related Appeals and Interferences

Applicant asserts that no other prior or pending appeals, interferences, or judicial proceedings are known to the Applicant, the Applicant's legal representative, or assignee which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III. Status of Claims

Claims 1, 4-6, 21-25, and 27-33 are pending in the application and stand rejected. Claims 1-24 were originally presented in the application. Claims 2-3 and 7-20 were canceled and new claims 25-33 were added by Applicant in Applicant's Response to the Office Action dated April 23, 2007. Claim 26 was canceled by Applicant in Applicant's Response to the Office Action dated December 28, 2007.

The rejection of pending claims 1, 4-6, 21-25, and 27-33 is appealed. Those pending claims are shown in the attached Claims Appendix.

IV. Status of Amendments

All amendments have been entered by the Examiner and are reflected in the listing of claims shown in the Claims Appendix.

V. Summary of Claimed Subject Matter

Claims 1, 4-6, 21-25, and 27-33 are pending in the application and appealed. The independent claims are claims 1, 21, 23, 25, and 29. The subject matter recited in independent claim 1 relates to a particulate stripping unit with a self-stripping disengagement feature for separating particulates from a carrier fluid (e.g. paragraph 1; paragraph 13). The claimed apparatus includes a vessel having a cyclone section and a stripping section (e.g. paragraph 14, lines 3-9; paragraph 39, line 5; paragraph 40, line 3; and Figure 1); the stripping section having a cross-sectional area less than a cross-sectional area of the cyclone section (e.g. Figures 1 and 2); an inlet to tangentially feed a particulate-fluid suspension to the cyclone section (e.g. paragraph 14, lines 4-5; paragraph 39, line 5; paragraph 41, lines 1-2; Figures 1 and 2); a cylindrical surface within the cyclone section to separate a major fraction of the particulates from the suspension and form a vortex of reduced particulate content (e.g. paragraph 14, lines 5-7; paragraph 39, line 6; paragraph 41, lines 2-6; Figures 1 and 2); a particulate discharge outlet from the cyclone section to the stripping section (e.g. paragraph 14, lines 8-9; Figure 1); a plurality of apertures disposed through a lower portion of the stripping section (e.g. paragraph 14, lines 9-10; paragraph 40, lines 5-7; paragraph 42, lines 5-6; Figures 1 and 3); and a discharge line from the cyclone section in communication with the vortex (e.g. paragraph 14, lines 11-12; paragraph 39, lines 8-9; paragraph 41, lines 6-7; Figure 1).

The subject matter recited in independent claim 21 relates to a method for stripping vapor from a suspension of particulates in a carrier gas (e.g. paragraph 1; paragraph 13). The method of claim 21 includes separating particulates from the suspension in a separation zone having a first cross-sectional area to form a particulate-rich stream with entrained vapor and a vapor stream lean in suspended matter (e.g. paragraph 22, lines 1-5; paragraph 41, line 1 through paragraph 42, line 13); introducing a stripping fluid through a plurality of unobstructed openings formed through a lower exterior wall of a stripping zone disposed below the separation zone, the stripping zone having a second cross-sectional area less than the first cross-sectional area of the separation zone (e.g. paragraph 22, lines 5-7; paragraph 42, lines 5-7); passing the particulate-rich stream from the separation zone through the stripping zone (e.g. paragraph 22, lines 7-8; paragraph 42, lines 1-3) making countercurrent contact with the stripping fluid to remove at least

a portion of the entrained vapor (e.g. paragraph 22, lines 8-9; paragraph 42, lines 5-9) and into a dipleg in communication with the stripping zone (e.g. paragraph 22, lines 9-10; paragraph 1-3); and recovering stripped particulates from the dipleg (e.g. paragraph 22, lines 10-11).

The subject matter of independent claim 23 relates to a method for retrofitting an existing cyclone to a self-stripping cyclone, wherein the existing cyclone is housed within a pressurized vessel to receive a vapor-solid suspension and separate the suspension into a solids-rich stream and a solids-lean stream, the existing cyclone has a sealed lower discharge to pass the particulates into the pressurized vessel, and the existing cyclone is connected to a plenum in communication with an exterior of the pressurized vessel to recover the solids-lean stream (e.g. paragraph 1; paragraph 13). The method of claim 23 includes installing a new section beneath the existing cyclone to provide a stripping zone in communication with the existing cyclone (e.g. paragraph 23, lines 8-10; paragraph 49, lines 1-4) wherein the new section has a cross-sectional area less than a cross-sectional area of the existing cyclone and a plurality of unobstructed openings formed through a lower portion of the stripping zone to introduce a stripping fluid into the stripping zone (e.g. paragraph 23, lines 12-13; paragraph 50, lines 4-6); and replacing the unsealed joint with a sealed joint, if the plenum of the existing cyclone comprises an unsealed joint (e.g. paragraph 23, lines 14-15; paragraph 49, lines 8-11).

The subject matter defined in independent claim 25 relates to an apparatus for separating particulates from a carrier fluid (e.g. paragraph 1; paragraph 13). The apparatus of claim 25 includes an upper section with a first cross-sectional area (e.g. paragraph 14, lines 3-4; paragraph 39, line 5; Figures 1 and 2); a lower section with a second cross-sectional area, wherein the second cross-sectional area is less than the first cross-sectional area (e.g. paragraph 14, lines 8-9; Figures 1 and 2); a conical member disposed within the lower section and mounted coaxially along a longitudinal centerline of the lower section thereby forming one or more passages therebetween (e.g. paragraph 15, lines 5-8; Figures 1 and 2); a tangential inlet adapted to feed a particulate-fluid suspension to the upper section wherein at least a portion of the upper section has a cylindrical surface to separate a major fraction of the particulates from the suspension and form a vortex of reduced particulate content (e.g. paragraph 14, lines 4-8; Figures 1 and 2); and the lower section comprising a lower surface having a plurality of unobstructed openings formed therethrough (e.g. paragraph 15, lines 2-3; Figures 1 and 3).

The subject matter defined in independent claim 29 relates to a method for stripping particulates from a particulate-fluid suspension (e.g. paragraph 1; paragraph 13). The method of claim 29 includes introducing a particulate-fluid suspension to a vessel comprising an upper section with a first cross-sectional area (e.g. paragraph 14, lines 3-9; Figure 1); a lower section with a second cross-sectional area, wherein the second cross-sectional area is less than the first cross-sectional area (e.g. paragraph 40, line 3; Figures 1 and 2); a conical member disposed within the lower section and mounted coaxially along a longitudinal centerline of the lower section thereby forming one or more passages therebetween (e.g. paragraph 15, lines 5-8; paragraph 40, lines 1-3; Figures 1 and 2); a tangential inlet to feed a particulate-fluid suspension to the upper section (e.g. paragraph 14, lines 4-5; paragraph 39, line 5; paragraph 41, lines 1-2; Figures 1 and 2), wherein at least a portion of the upper section has a cylindrical surface to separate a major fraction of the particulates from the suspension and form a vortex of reduced particulate content (e.g. paragraph 14, lines 5-7; paragraph 39, line 6; paragraph 41, lines 2-6; Figures 1 and 2); and the lower section comprising a lower surface having a plurality of unobstructed openings formed therethrough (e.g. paragraph 14, lines 9-10; paragraph 40, lines 5-7; paragraph 42, lines 5-6; Figures 1 and 3); separating particulates from the particulate-fluid suspension using the cylindrical surface within the upper section thereby forming a vortex of reduced particulate content (e.g. paragraph 22, lines 1-5; paragraph 41, line 1 through paragraph 42, line 13); settling the separated particulates into the lower section (e.g. paragraph 18, lines 4-5; paragraph 40, lines 7-8; paragraph 48, lines 7-8); and introducing a fluid through the plurality of unobstructed openings in the lower surface of the lower section (e.g. paragraph 22, lines 5-7; paragraph 42, lines 5-7).

VI. Grounds for Rejection to be Reviewed on Appeal

The following grounds of rejection are to be reviewed on appeal.

A. The rejection of claims 1, 5, 6, 21-25, 26, and 27-33 under 35 U.S.C. § 103(a) as being unpatentable over Parker (U.S. Patent No. 4,692,311; hereafter "*Parker*").[1]

B. The rejection of claims 1, 5, 6, 21-24, 26, and 27 under 35 U.S.C. § 103(a) over *Parker* in view of Simpson (U.S. Patent No. 7,108,138; hereafter "*Simpson*") and as further evidenced by Dewitz (U.S. Patent No. 5,869,008; hereafter "*Dewitz*") or Ko (N.W.M Ko & A.S.K. Chan, In the intermixing Region Behind Circular Cylinders With Stepwise Change of the Diameter, 9 Experiments in Fluids 213-221 (1990); hereafter "*Ko*") or Mori (U.S. Patent No. 6,041,754; hereafter "*Mori*") or Wasif (U.S. Publication No. 2005/0016178; hereafter "*Wasif*") or Hwang (U.S. Publication No. 2005/0183664; hereafter "*Hwang*").[2]

C. The rejection of claim 4 under 35 U.S.C. § 103(a) over *Parker* in view of Fandel (U.S. Patent No. 5,843,377; hereafter "*Fandel*").

D. The rejection of claim 4 under 35 U.S.C. § 103(a) over *Parker* in view of *Simpson* and *Fandel*.

[1] Claim 26 was previously canceled. Accordingly, this rejection is moot with regard to this claim.
[2] Claim 26 was previously canceled. Accordingly, this rejection is moot with regard to this claim.

VII. Argument

A. *Parker* Does Not Teach, Show, or Suggest the Claimed Invention

Claims 1, 5, 6, 21-25, and 27-33 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Parker (U.S. Patent No. 4,692,311; hereafter "*Parker*"). The Examiner asserts, "Parker discloses a particulate stripping unit (Fig. 2) . . . [having] a vessel (17) having a cyclone section (24) and a stripping section (27) . . . [and] a plurality of apertures disposed through a lower portion of the stripping section (*See*, *Parker*, Fig. 2; and column 6, lines 22-24. . . ." *Final Office Action dated July 24, 2008* at pages 3-4. The Examiner admits that "*Parker* does not disclose wherein the particulate stripping unit comprises a stripping section having a cross-sectional area less than a cross-sectional area of the cyclone section." *Final Office Action dated July 24, 2008* at page 4, lines 7-9. Yet, the Examiner maintains this rejection of claims 1, 5, 6, 21-25, and 27-33 in view of *Parker* alone.

Such rejection is clearly erroneous because *Parker* does not teach, show, or suggest all the limitations of any pending claim. At the very least, *Parker* does not teach, show, or suggest a particulate stripping unit having a cyclone section and a stripping section, where the stripping section has a cross-sectional area less than a cross-sectional area of the cyclone section, as required in every claims.

To the contrary, *Parker* discloses a cyclonic particle stripping unit that has a constant diameter, and thus, a constant or equal cross-sectional area, from top to bottom. *See, e.g., Parker* at col. 6, lines 2-9 and Figures 1 and 2. Therefore, at the very least, *Parker* does not teach, show, or suggest a cyclone section and a stripping section, where the stripping section has a cross-sectional area less than a cross-sectional area of the cyclone section, as required in every claim. For at least this reason, withdrawal of the rejection and allowance of the claims 1, 5, 6, 21-25, and 27-33 is respectfully requested.

Furthermore, *Parker* does not teach, show, or suggest a plurality of apertures or unobstructed openings disposed through a lower portion of the stripping section, as required in every claim. To the contrary, *Parker* discloses an annular plenum 33 and a sintered stainless steel ring 34 at the bottom of the catalyst bed 35. *See*, *Parker* at col. 6, lines 23-24 and Figure 2.

It is well known and widely recognized that sintered metal rings are solid structures that do not have apertures or unobstructed openings, as those terms are known and used in the art. The plain and ordinary meaning of the term "aperture" means "[a]n opening, such as a hole, gap, or slit." *See, The American Heritage® Dictionary of the English Language*, Fourth Edition, Houghton Mifflin Company, 2004, at http://dictionary.reference.com/browse/aperture (last visited Jan. 19, 2009). The plain and ordinary meaning of the term "unobstructed" means "[f]ree from obstructions; clear: an unobstructed view." *See, The American Heritage® Dictionary of the English Language*, Fourth Edition, Houghton Mifflin Company, 2004, at http://dictionary.reference.com/browse/unobstructed (last visited Jan. 19, 2009). Conversely, a sintered metal ring is a coherent mass or solid structure having a plurality of voids contained therein, *i.e.* not "apertures" or "unobstructed openings" formed therethrough.

The term "sintered" means "[t]o cause (metallic powder, for example) to form a coherent mass by heating without melting." *See, The American Heritage® Dictionary of the English Language*, Fourth Edition, Houghton Mifflin Company, 2004, at http://dictionary.reference.com/browse/sinter (last visited Jan. 19, 2009). *See also, Merriam-Webster Online Dictionary*, at http://www.merriam-webster.com/dictionary/sinter (last visited Jan. 19, 2009). A sintered stainless steel ring, therefore, does not have a hole, gap, or slit, nor is a sintered stainless steel ring free from obstructions, clear, or have an unobstructed view.

If one were to hold a sintered metal ring in their hand, that person would not be able to see his/her hand on the other side. The sintered metal ring would completely block their view. However, if one were to hold an object of the same size having a plurality of apertures or unobstructed openings disposed therethrough, that person would be able to see their hand through those openings.

In the Examiner's *Final Office Action dated July 24, 2008*, at page 14, the Examiner used the term "diffusion" to describe the passage of fluid through a sintered metal ring. Such word choice could not describe any better the physical and functional differences between a sintered metal and apertures/unobstructed openings. With an aperture or unobstructed opening, a fluid can "flow" through with significantly less or little pressure drop compared to the same fluid that diffuses through a sintered metal. Hence, the very reason *Parker* does not teach, show, or suggest a stripping section having a cross-section less than a cross-section of a cycIone section,

as discussed above. The pressure drop across the sintered stainless steel ring 34 significantly reduces the pressure of the injected air/ammonia stripping gas so that a larger diameter cyclone section is not required to provide pressure drop. Without a pressure drop somewhere in the stripping unit of *Parker*, the solids would not efficiently separate, and instead, would carryover the top with the gas. The sintered metal ring 34 of *Parker* provides its required pressure drop to prevent solids carryover.

Accordingly, no person having ordinary skill in the art would ever consider a sintered stainless steel ring disclosed in *Parker* to be the equivalent of an object or ring with a plurality of apertures or unobstructed openings, as required in every claim. Therefore, *Parker* does not teach, show, or suggest a plurality of apertures or unobstructed openings disposed through a lower portion of the stripping section, as required in base claims 1, 21, 23, 25, and 29, as well as those dependent therefrom. Withdrawal of the rejection and allowance of the claims is respectfully requested

B. A Combination of *Parker*, in View of *Simpson* and as Further Evidenced by *Dewitz*, *Ko*, *Mori*, or *Hwang*, Does Not Teach, Show, or Suggest the Claimed Invention[3]

Claims 1, 5, 6, 21-24, 26, and 27 stand rejected under 35 U.S.C. § 103(a) over *Parker* in view of Simpson (U.S. Patent No. 7,108,138; hereafter "*Simpson*") and as further evidenced by Dewitz (U.S. Patent No. 5,869,008; hereafter "*Dewitz*") or Ko (N.W.M *Ko* & A.S.K. Chan, *In the intermixing Region Behind Circular Cylinders With Stepwise Change of the Diameter*, 9 Experiments in Fluids 213-221 (1990); hereafter "*Ko*") or Mori (U.S. Patent No. 6,041,754; hereafter "*Mori*") or Wasif (U.S. Publication No. 2005/0016178; hereafter "*Wasif*") or Hwang (U.S. Publication No. 2005/0183664; hereafter "*Hwang*"). The Examiner acknowledges that "Parker does not disclose wherein the particulate stripping unit comprises a stripping section having a cross-sectional area less than a cross-sectional area of the cyclone section." *Final Office Action dated July 24, 2008,* at pages 3 to 4. However, the Examiner contends that "it is known to those in the art that changes in diameter of a conduit through which fluid flows will induce a vortex to form therein." *Id.* The Examiner further asserts that "Simpson instructs that 'in order to enhance and aid the interior vortex development, one needs to introduce diffuser air at a cylinder

diameter larger than the cyclone outlet diameter.'" The Examiner further asserts that "Simpson discloses wherein his cyclone material classifier uses 'a plurality of openings disposed through a lower portion of the stripping section.'" *Id.* at pages 4-5. The Examiner cites *Ko*, *Mori*, *Wasif*, or *Hwang* in further support of these assertions. *Id.*

Applicant respectfully traverses the rejection on grounds that a combination of *Parker*, in view of *Simpson* and as further evidenced by *Ko*, *Mori*, *Wasif*, or *Hwang*, teaches away from the claimed invention. Applicant also respectfully traverses the rejection on grounds that modifying *Parker*, in view of *Simpson* and as further evidenced by *Ko*, *Mori*, *Wasif*, or *Hwang*, would render *Parker* unsuitable for its intended purpose. Finally, Applicant respectfully traverses the rejection on grounds that *Simpson* is non-analogous prior art.

1. The Combination of *Parker*, in View of *Simpson* and as Further Evidenced by *Dewitz*, *Ko*, *Mori*, *Wasif* or *Hwang*, Teaches Away From the Claimed Invention

Applicant respectfully traverses the rejection on grounds that a combination of *Parker*, in view of *Simpson* and as further evidenced by *Ko*, *Mori*, *Wasif*, or *Hwang*, teaches away from the claimed invention. As discussed above, *Parker* does not teach, show, or suggest a cyclone section and a stripping section, where the stripping section has a cross-sectional area less than a cross-sectional area of the cyclone section, as required in base claims 1, 21, 23, 25, and 29, as well as those dependent therefrom. *Parker* also does not teach, show, or suggest a plurality of apertures or openings disposed through a lower portion of the stripping section, as required in base claims 1, 21, 23, 25, and 29, as well as those dependent therefrom. *Simpson* adds nothing to the deficiencies of *Parker*. *Simpson* discloses a material classifier for classifying particles into at least two classifications, *i.e.* smaller particles and larger particles. *See*, *Simpson* at col. 6, lines 47-54. *Simpson* has nothing to do with stripping particulates, nor anything to do with separating particulates from a gas.

Simpson's classifier uses a blower 200 located at the top of the classifier and a diffuser 305 at the bottom of the classifier. The blower 200 creates a vacuum or suction on the cyclone inlet 102 to draw in the granular material to be separated. Col. 4, lines 64-67. The granular materials enters the cyclone housing 101 and "the heavier coarse particles 106 through

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[3] *Dewitz* is only used to reject claims 23 and 24, and is addressed separately at the end.

centrifugal force are swept to the exterior periphery of cyclone housing 101 and make their way downwardly in vertical direction 191 towards cyclone outlet 103." Col. 5, lines 8-11. Diffuser air 304 enters through air slots 305 defined around the entire cylinder and out periphery 350. Col. 5, lines 41-42. The diffuser air "fluidizes or entrains, [sic] fine particles by supporting and enlarging the up draft interior vortex 702." Col. 5, lines 42-43. The "diffuser air 304 rising upwardly into stand pipe 104 creates a strong upward draft such that by controlling the amount of diffuser air 304, one controls the strength and velocity of air within interior vortex 702 and in this manner, one can control the size of particles which are fluidized by interior vortex 702 and which eventually make their way through blower 200 and out through blower discharge 250." Col. 5, lines 45-52.

Simpson states that "in order to enhance and aid the interior vortex 702 development, one needs to introduce diffuser air 304 at a cylinder diameter 342 which is larger than the cyclone outlet diameter." *Simpson* at col. 6, lines 16-19. *Simpson* says nothing about a cross-sectional area of a stripping section being smaller than a cross-sectional area of a cyclone section. Indeed, *Simpson* makes no reference or teaching about the relationship between its cyclone section and diffuser section. *Simpson* merely discloses and suggests that the diffuser diameter 342 has to be larger than the cyclone outlet diameter 103 (not the cyclone section itself) in order to create the proper lift from the interior vortex 702 that is used to separate, *i.e.*, classify the larger particles from the smaller particles. If anything, *Simpson* suggests modifying *Parker* to make its stripping zone 27 (lower zone) larger than its cyclone zone 24 (upper zone). Such modification is the opposite of the claimed invention that requires a stripping section having a cross-section area that is less than that of the cyclone section.

Nonetheless, *Simpson* indeed suggests modifying *Parker* to include a strong interior vortex, which is exactly what *Parker* is trying to avoid and teaches against. *Parker* uses a vortex stabilizer 26 to prevent disruption of its (exterior) vortex by the upward flowing stripping gas. *See*, *Parker* at col. 5, lines 2-32; and Figure 2. *Parker* discloses that unacceptable catalyst carryover would result if not for the stabilizer. *Id.* at lines 26-32. As such, it is clear that *Parker* teaches away from creating an interior vortex as taught by *Simpson* due to the mere presence of the stabilizer. Therefore, *Parker* teaches away from any diameter and cross-section changes disclosed in *Simpson*.

Concerning *Ko*, *Mori*, *Wasif*, and *Hwang*, Applicant agrees that these references disclose that changes in the diameter of a conduit through which a fluid flows induces a vortex. Indeed, the diameter step changes disclosed *Ko*, *Mori*, *Wasif*, and *Hwang* may further increase the strength of the interior vortex 702 of *Simpson* as taught by *Simpson*, but this is exactly what *Parker* teaches against.

For reasons discussed above, the Examiner's proposed modifications to *Parker* would lead to an enhancement of an interior vortex, which would cause the smaller particulates of *Parker* to exit with the clean gas through the overhead outlet 20 at the top of the stripper cyclone 17, rather than through the catalyst outlet 23, at the bottom of the stripper cyclone 17. This particle carryover is exactly what *Parker* sought to avoid and teaches against. Therefore, the rejection of claims 1, 5, 6, 21-24, and 27 under 35 U.S.C. § 103(a) is improper. Withdrawal of the rejection and allowance of the claims is respectfully requested.

2. Modifying *Parker*, in View of *Simpson* and as Further Evidenced by *Dewitz*, *Ko*, *Mori*, or *Hwang*, Would Render *Parker* Unsuitable for Its Intended Purpose

Modifying *Parker*, in view of *Simpson* and as further evidenced by *Ko*, *Mori*, *Wasif*, or *Hwang*, would render *Parker* unsuitable for its intended purpose, *i.e.*, the separation of particulates from gas. As discussed above, *Simpson* discloses a material classifier for classifying particles into at least two classifications, *i.e.* smaller particles and larger particles, and *Ko*, *Mori*, *Wasif*, and *Hwang* disclose that changes in the diameter of a conduit through which a fluid flows induces a vortex. *Parker* has no interest in classifying particulates and no interest in enhancing an interior vortex. Rather, *Parker* is concerned with separating all particulates, no mater what the relative size.

As stated above, *Simpson* states that "in order to enhance and aid the interior vortex 702 development, one needs to introduce diffuser air 304 at a cylinder diameter 342 which is larger than the cyclone outlet diameter." *Simpson* at col. 6, lines 16-19. *Simpson* says nothing about a cross-sectional area of a stripping section being smaller than a cross-sectional area of a cyclone section. Indeed, *Simpson* makes no reference or teaching about the relationship between its cyclone section and diffuser section. *Simpson* merely discloses and suggests that the diffuser diameter 342 has to be larger than the cyclone outlet diameter 103 (not the cyclone section itself)

in order to create the proper lift from the interior vortex 702 that is used to separate, *i.e.,* classify the larger particles from the smaller particles.

Indeed, *Simpson* as further evidence by *Ko*, *Mori*, *Wasif*, and *Hwang*, suggests modifying *Parker* to include a strong interior vortex, which would render *Parker* unsuitable for its intended purpose. *Parker* uses a vortex stabilizer 26 to prevent disruption of its (exterior) vortex by the upward flowing stripping gas. *See*, *Parker* at col. 5, lines 2-32; and Figure 2. Accordingly, *Parker* discloses that a strong or enhanced interior vortex would cause unacceptable catalyst carryover. *Id.* at lines 26-32. As such, a stronger or enhanced interior vortex disclosed in *Simpson* within the cyclone section of *Parker* is detrimental to the separation of its particulates and as such, would render *Parker* unsuitable for its intended purpose.

Therefore, a rejection of claims 1, 5, 6, 21-24, and 27 under 35 U.S.C. § 103(a) is improper. Withdrawal of the rejection and allowance of the claims is respectfully requested.

3. *Simpson* is Non-analogous Prior Art

Simpson is non-analogous prior art. To rely on a reference as a basis for rejection, the reference must be analogous prior art. MPEP § 2141.01(a)(1). Thus, a reference in a field different from that of applicant's endeavor may be reasonably pertinent if it is one which, because of the matter with which it deals, logically would have commended itself to an inventor's attention in considering his or her invention as a whole. *Id.* The whole invention must be considered, not just the differences themselves.

As discussed above, *Simpson* is in a completely different field from both *Parker* and the claimed invention. *Simpson* discloses a material classifier that is intended to separate coarse granular particles 106 from finer granular particles 107. The separated coarse particles 106 are discharged from an air lock housing 401 and the finer granular particles 107 are discharged from the blower discharge 250 to a bag house 502. *See*, *Simpson* at col. 3, lines 57-64. The disclosure of *Simpson* is not related and has nothing to do with separating particulates from a gas like *Parker* and the claimed invention. *Simpson* is also not related to stripping the particulates prior to or during separation from the gas like the claimed invention.

Therefore, one of ordinary skill in the art would not have logically consulted the teachings of *Simpson* in attempting to solve the problems associated those of *Parker* and the claimed

invention. Accordingly, *Simpson* is non-analogous prior art, and the rejections of the claims under 35 U.S.C. § 103(a) as being unpatentable in view of *Simpson* is improper and must be withdrawn.

Finally, claims 23 and 24 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *Parker* in view of *Simpson* and as further evidenced by *Dewitz*. The Examiner states that "it is generally known in the art to retrofit existing cyclones, e.g. in order to make use of existing process equipment and to save on new equipment costs (see e.g. *Dewitz* (US 5869008) at column 9, lines 19-46)." *Final Office Action dated July 24, 2008* at page 8. *Parker* and *Simpson* have been discussed and distinguished above. *Dewitz* adds nothing to the deficiencies of *Parker* and *Simpson* and therefore, *Dewitz* does not require any further discussion. Withdrawal of the rejection and allowance of claims 23 and 24 is respectfully requested.

For the foregoing reasons, a combination of *Parker*, in view of *Simpson* and as further evidenced by *Dewitz, Ko, Mori, Wasif*, or *Hwang*, teaches away from the claimed invention and/or renders *Parker* unsuitable for its intended purpose. Moreover, *Simpson* is non-analogous prior art. As such, withdrawal of the rejections and allowance of the claims is respectfully requested.

C. *Parker* in View of *Fandel* Does Not Teach, Show, or Suggest the Claimed Invention

Claim 4 stands rejected under 35 U.S.C. § 103(a) over *Parker* in view of Fandel (U.S. Patent No. 5,843,377; hereafter "*Fandel*").

Parker and *Simpson* have been discussed and distinguished above. *Fandel* adds nothing to the deficiencies of *Parker* and *Simpson*. Furthermore, since claim 4 includes all the limitations of base claim 1, claim 4 is allowable for at least the same reasons. Withdrawal of the rejection and allowance of claim 4 is respectfully requested.

D. *Parker* in View of *Simpson* and *Fandel* Does Not Teach, Show, or Suggest the Claimed Invention

Claim 4 stands rejected under 35 U.S.C. § 103(a) over *Parker* in view of *Simpson* and *Fandel*.

Parker and *Simpson* have been discussed and distinguished above. *Fandel* adds nothing to the deficiencies of *Parker* and *Simpson*. Furthermore, since claim 4 includes all the limitations of base claim 1, claim 4 is allowable for at least the same reasons. Withdrawal of the rejection and allowance of claim 4 is respectfully requested.

E. Conclusion

The references alone or in combination do not teach, show or suggest the claimed invention. Therefore, Applicant submits that the pending claims are patentable over the references, and respectfully request withdrawal of the rejections and allowance of the claims.

Respectfully submitted,

Robb D. Edmonds

January 26, 2009

Date

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VIII. Claims Appendix

1. (Previously Presented) A particulate stripping unit with a self-stripping disengagement feature for separating particulates from a carrier fluid, comprising:

a vessel having a cyclone section and a stripping section, the stripping section having a cross-sectional area less than a cross-sectional area of the cyclone section;

an inlet to tangentially feed a particulate-fluid suspension to the cyclone section;

a cylindrical surface within the cyclone section to separate a major fraction of the particulates from the suspension and form a vortex of reduced particulate content;

a particulate discharge outlet from the cyclone section to the stripping section;

a plurality of apertures disposed through a lower portion of the stripping section; and

a discharge line from the cyclone section in communication with the vortex.

Claims 2-3 (Canceled).

4. (Previously Presented) The particulate stripping unit of claim 1, further comprising a thermal expansion joint disposed on the discharge line from the cyclone section.

5. (Previously Presented) The particulate stripping unit of claim 1, further comprising a stabilizer disposed between the vortex and the stripping section, the stabilizer comprising one or more annular passages disposed therethrough.

6. (Previously Presented) The particulate stripping unit of claim 1, wherein the inlet is connected to a fluidized catalytic cracking (FCC) riser.

Claims 7-20 (Canceled).

21. (Previously Presented) A method for stripping vapor from a suspension of particulates in a carrier gas, comprising:

separating particulates from the suspension in a separation zone having a first cross-sectional area to form a particulate-rich stream with entrained vapor and a vapor stream lean in suspended matter;

introducing a stripping fluid through a plurality of unobstructed openings formed through a lower exterior wall of a stripping zone disposed below the separation zone, the stripping zone having a second cross-sectional area less than the first cross-sectional area of the separation zone;

passing the particulate-rich stream from the separation zone through the stripping zone, making countercurrent contact with the stripping fluid to remove at least a portion of the entrained vapor, and into a dipleg in communication with the stripping zone; and

recovering stripped particulates from the dipleg.

22. (Previously Presented) The method of claim 21 wherein the stripping zone is in fluid communication with the separation zone via an annular passage defined by an outside diameter of a stabilizer and an interior wall of the-stripping zone.

23. (Previously Presented) A method for retrofitting an existing cyclone to a self-stripping cyclone, wherein the existing cyclone is housed within a pressurized vessel to receive a vapor-solid suspension and separate the suspension into a solids-rich stream and a solids-lean stream, the existing cyclone has a sealed lower discharge to pass the particulates into the pressurized vessel, and the existing cyclone is connected to a plenum in communication with an exterior of the pressurized vessel to recover the solids-lean stream, the method comprising:

installing a new section beneath the existing cyclone to provide a stripping zone in communication with the existing cyclone, wherein the new section has a cross-sectional area less than a cross-sectional area of the existing cyclone and a plurality of unobstructed openings formed through a lower portion of the stripping zone to introduce a stripping fluid into the stripping zone; and

replacing the unsealed joint with a sealed joint, if the plenum of the existing cyclone comprises an unsealed joint.

24. (Previously Presented) The method of claim 23, wherein the new section comprises a vortex stabilizer wherein the vortex stabilizer and an interior wall of the cyclone define an annular passage therebetween.

25. (Previously Presented) An apparatus for separating particulates from a carrier fluid, comprising:

an upper section with a first cross-sectional area;

a lower section with a second cross-sectional area, wherein the second cross-sectional area is less than the first cross-sectional area;

a conical member disposed within the lower section and mounted coaxially along a longitudinal centerline of the lower section thereby forming one or more passages therebetween;

a tangential inlet adapted to feed a particulate-fluid suspension to the upper section wherein at least a portion of the upper section has a cylindrical surface to separate a major fraction of the particulates from the suspension and form a vortex of reduced particulate content; and

the lower section comprising a lower surface having a plurality of unobstructed openings formed therethrough.

26. (Cancelled)

27. (Previously Presented) The apparatus of claim 25 wherein a tapered transition section is disposed between the upper section and the lower section.

28. (Previously Presented) The apparatus of claim 25 wherein the conical member comprises an apex disposed toward the upper section and a base defining one or more passages with an inner wall of the lower section.

29. (Previously Presented) A method for stripping particulates from a particulate-fluid suspension comprising:

introducing a particulate-fluid suspension to a vessel comprising:

an upper section with a first cross-sectional area;

a lower section with a second cross-sectional area, wherein the second cross-sectional area is less than the first cross-sectional area;

a conical member disposed within the lower section and mounted coaxially along a longitudinal centerline of the lower section thereby forming one or more passages therebetween;

a tangential inlet to feed a particulate-fluid suspension to the upper section wherein at least a portion of the upper section has a cylindrical surface to separate a major fraction of the particulates from the suspension and form a vortex of reduced particulate content; and

the lower section comprising a lower surface having a plurality of unobstructed openings formed therethrough;

separating particulates from the particulate-fluid suspension using the cylindrical surface within the upper section thereby forming a vortex of reduced particulate content;

settling the separated particulates into the lower section; and

introducing a fluid through the plurality of unobstructed openings in the lower surface of the lower section.

30. (Previously Presented) The method of claim 29, wherein a solids flux rate in the lower section is about 24 kilograms per square meter to about 440 kilograms per square meter of stripping section cross-sectional area per second.

31. (Previously Presented) The method of claim 29, wherein a superficial velocity of the fluid passing through the lower section is about 0.1 to about 5.0 meters per second.

32. (Previously Presented) The method of claim 29, wherein a velocity of the stripping fluid through the plurality of openings is about 9 to about 90 meters per second.

33. (Previously Presented) The method of claim 29, wherein the particulate-fluid suspension is a fluidized catalytic cracker riser stream containing hydrocarbon gas and particulates.

IX. Evidence Appendix

None.

X. Related Proceedings Appendix

None.